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SAMUEL CALVIN

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Samuel Calvin, who died at Iowa City, Iowa, April 17, 1911, was born in Wigtonshire, Scotland, February 2, 1840. He passed the first eleven years of his life in the little town of Wigton, living the simple, hardy life common in Scotch families of moderate means. As a boy, after school hours, he often paused at the edge of the cliff to look down upon Wigton Bay in which lay ships and schooners from all parts of the world. At that period trade between America and the various little ports on Solway Firth was active, and the longing for travel, common to all boys, was greatly stimulated in young Calvin by the sight of the vessels that came and went. Among his school companions was James Wilson, now Secretary of Agriculture, and a friendship was there formed that continued through life. The Calvin and Wilson families both emigrated to the United States in 1851, the Calvins going direct to Iowa and the Wilsons following after a short sojourn in Connecticut. Thomas Calvin, the father of Samuel Calvin, took up land south of Manchester, Iowa. At that time neighbors were few and far between in eastern Iowa. The first residents came from Indiana and, being accustomed to a wooded country, feared to venture upon the open prairie. They accordingly settled near the streams on what proved to be the poorer land. The Calvins and their associates, evidently thinking that having ventured so much in coming from Scotland they might as well venture more and save themselves the work of clearing off timber, chose prairie land. It thus happened that from early boyhood Samuel Calvin was familiar with the great granite bowlders that mark the fertile prairies covered by the Iowan drift. Between farm work, school, and the usual country sports, his time was fully occupied until about 1861, when he entered Lenox College, at Hopkinton, near by. Lenox College, was, and is, an excellent example of the small denominational colleges that the pioneers of the Middle West founded so prolifically and supported with so much sacrifice. Without the equipment of a present-day university, or a staff of world-famous professors, it was still an excellent place for a young man desirous of getting at the fundamentals of the simple college curriculum of a half-century ago. Here Calvin remained and studied until near the close of the great Civil War, when, in company with most of the instructors and students who had not already gone to the front, he enlisted in 1864 in one of the Iowa regiments. Fortunately the war was nearly over. His military service was therefore neither long nor was it distinguished, in the sense of taking him into great battles. For the most part it was a period of dull routine, of guard duty and of marching, of occasional small skirmishes with the enemy, and a continual private skirmish for acceptable food and some comfort. He learned the rudiments of a soldier's life and the routine of camping—the latter much the more valuable to him.

At the close of the war, Calvin, with many others no longer young, went back to college to finish his studies. The college, however, had been practically wrecked. The call for men had taken both instructors and students, and while the buildings were still there, the life of the institution had been nearly broken up. After the ensuing reorganization Calvin found himself in the ranks of the instructors rather than among the students, and the interrupted college course was only completed as a result of much hard private study.

At Lenox College, among other members of the new faculty, was Thomas H. Macbride, a graduate of Monmouth College, and a man who had had the advantage, then unusual for teachers in small western colleges, of study at the University of Bonn. Macbride's interests centered in botany, and Calvin, while broadly concerned with the whole of natural history, was already beginning to specialize in paleontology and geology. The two men became intimate friends and close companions. Together they explored the neighborhood and later, in the long vacations, the more distant parts of Iowa. With team, covered wagon, and simple camp outfit, trips were made as far west as the Missouri River, and collections of various sorts were brought back to enrich museum and classroom instruction. In the course of this work Calvin came into contact with C. A. White, at first state geologist and later professor in the State University at Iowa City. When White went East Calvin succeeded him at the university, and when the Iowa Geological Survey was re-established in 1892, he also followed him in the position of state geologist. The change to Iowa City, which took place in 1874, was an agreeable one, since the university, having larger resources, offered a larger opportunity for work; and for work Calvin always was greedy. The State University of Iowa in 1874 was not a large institution and the professors found plenty to do. Calvin occupied what has been aptly described as the "settee rather than chair" of natural history, and, as he once whimsically phrased it, he was ever after "shedding professorships." As rapidly as funds would permit he divided the work and called other men to him. Among the first was Macbride, then Nutting, and others in succession until in the closing years of his work it was not only possible for him to confine his work to geology, but to have the aid of an able corps of assistants in that. His work in the other sciences, however, was more than timeserving. His interest in animal morphology was especially keen, and in organizing and conducting zoölogical explorations he did work of real value. The results of the Bahama expedition, which brought back such unheard-of wealth of specimens of living crinoids, were due in no small part to him.

As a geologist Calvin's name and fame are principally bound up with that of the Iowa Geological Survey, which, except for a brief interim, he directed from the day of its organization, in 1892, to the day of his death. As a former member of the staff of this Survey I may be over-partial, but it is none the less my conviction that, considering time, place, and means, the Iowa Survey is and has been one of the best-conducted institutions of its kind in America. It serves the people and the state of Iowa well, meeting their peculiar needs. In other states different methods are necessary, as they will become in time in Iowa.

The Iowa Survey owes much to Calvin. It also owes a not-to-be-forgotten debt to Charles R. Keyes, the principal assistant at the time the Survey was organized and through the period when plans were being formulated. In brief the Survey has served two main purposes: (1) It has furnished handbooks, consisting of maps and reports on the geology of the individual counties, written in simple language adapted to the understanding of students and intelligent laymen; (2) scientific and technical reports have been issued as occasion offered, covering all phases of the natural history of the state and the economic development of its resources. According to the report for the year ending December 31, 1909, all but nine counties had been surveyed and reports prepared and issued. More detailed surveys, based on topographic maps made in co-operation with the United States Geological Survey, had already been begun in areas of especial economic importance, and, as conditions permit, this system of more refined mapping will doubtless be extended over the state. In the meantime the county reports serve extremely useful purposes and afford a sure basis for broad general studies. The special reports on scientific and economic subjects have been numerous and valuable, as is attested by the list of publications of the Survey. The water, the coal, clay, stone, lead, zinc, gypsum, and minor mineral resources have all been studied by specialists, and information essential to their economical development set forth. The mineral industry has responded to the stimulus and the total value of the mineral output of the state is now many times what it was when the Survey was organized. Iowa is primarily an agricultural state and its mineral resources are relatively small; the educational phases of the Survey work have therefore always, and properly, been emphasized. On the narrow material basis, however, the Survey has made good return for the support of the state and it is deservedly popular. As an administrator, therefore, Calvin's work shows him to have been successful.

In scientific research, Calvin's personal interest lay mainly in paleontology and, in later years, in the study of the Pleistocene deposits. Aside from contributions to the paleontology of the Paleozoic invertebrates, Calvin will probably be best remembered for the discovery of the fauna of fish remains in the Devonian beds near Iowa City, and for his studies of the vertebrate remains of the Aftonian deposits. The fish remains have been investigated by C. R. Eastman, who found in them much of interest. The Aftonian bones are important because they permit fixing the age of a widely scattered series of puzzling deposits. In his last published administrative report[1] Calvin speaks of them as follows:

> This remarkable interglacial fauna is not altogether new to science. The individual species, and to some extent the fauna as a whole, have for some time been known to students of paleontology. It has also been known that some of the species were at one or more times inhabitants of Iowa. But, so far as concerns Iowa, it was not known that the few discovered forms, which heretofore have been represented by isolated finds, were contemporaneous; and outside of Iowa, in territory ranging from Texas to western Nebraska, the exact age of the beds in which the remains of this assemblage of extinct mammals were found was not definitely fixed. The fauna as a whole is markedly different from that familiar to the pioneer settlers of this State, very different from that known to the pioneers in any part of America. True horses were represented by at least two species, both quite distinct from our domestic species; there were three species of elephant, one of imperial size, and there were two mastodons, making in all five great proboscidians; there was at least one species of camel, an extinct bison, a gigantic stag, and two ponderous, awkward, clumsy ground sloths. The smallest of the three elephants seems to be identical with the hairy elephant or northern mammoth of Europe and Asia; it furnishes to this unique fauna a distinctly boreal element. The two great sloths, on the other hand, contribute an element distinctly South American. As found in Iowa, the age of the fauna is definite and clear. The beds in which the remains occur belong to the Aftonian stage; these animals lived, and the beds in which their remains were buried were laid down, in an interval of comparatively mild climate between the first and second stages of Pleistocene glaciation.

The quotation illustrates at once Calvin's broad scientific interest and the singular clearness of his writings, which makes it a pleasure to readers and a fit model for beginners.

Calvin's active interest in the Pleistocene deposits dates from

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[1] *Iowa Geol. Surv.*, XX, xxii.

1896. In the spring of that year he undertook to put into shape long-accumulated notes on Johnson, the county in which Iowa City is situated. It chances that two lobes of Iowan drift reach across the northern border of this county. South of these lobes are the loess hills characteristic of much of the Iowan border and, in turn, the broad loess-Kansan plains. At that time the southern boundary of the Iowan had not been traced. From the known presence of two drifts at Afton and elsewhere in southern Iowa, it had been inferred that the Iowan boundary was much farther south than now appears true. The battle for two ice-sheets has been but too recently won to encourage belief in many. Calvin, however, intimately familiar with the typical Iowan drift plane of Buchanan and Delaware counties, recognized at once that the phenomena of southern Johnson County required a new interpretation, and shortly thereafter hit upon the clue. The rest of the staff, inspired by his enthusiasm, started out like crusaders to overturn and rebuild the Pleistocene column. The field was particularly favorable since in Iowa the different drift sheets are mainly deployed rather than superimposed, and since, also, nearly the whole sequence is represented. With the kindly counsel of T. C. Chamberlin, with friendly visits from R. D. Salisbury, J. E. Todd, Albrecht Penck, Frank Leverett, and others, the work went rapidly. There were many field conferences, and the winter meetings of the Iowa Academy of Science became notable for the discussion of current Pleistocene problems. Naturally there were differences of opinion and later work has shown the need of some revision of first-stated conclusions. Out of it all, however, has come the recognition of the independence of the pre-Kansan, the thorough establishment of the Aftonian, and the concept of the Iowan ice sheet. As to the latter, especially, there has been, and still is, much difference of opinion. The Iowan drift is so peculiar, it is so local, and the phenomena are so puzzling, that some find themselves unable to accept the evidence of its existence. It is not my purpose to review the proofs. That has already been done most excellently by Calvin himself. It is sufficient to repeat here a remark made by him at the close of the first field season devoted to this study: "The Iowan ice sheet did so many queer things that we will never blame anyone not familiar with it in the field for denying its existence; but, whatever the explanation, there is a consistent and co-ordinate set of phenomena that demands explanation, and that is best interpreted by the hypothesis of a separate Iowan ice sheet."

Aside from his work at the university and on the Iowa Survey Calvin did his full share in the general work of his chosen profession. While he was not especially interested in economic geology, his advice was sought and valued by a number of Western mining companies; he was a member of the first Conservation Conference at the White House; he served on the National Advisory Board on Fuels and Structural Materials; he was an active member and officer of numerous professional societies, including the Geological Society of America, of which he was president in 1908; he was one of the founders of the *American Geologist*, and of the Association of State Geologists; and in many other positions he made his influence felt. He was a charming writer, a popular lecturer, and a most inspiring teacher. His personal influence was strong and deep, and the thousands of students who came into contact with him are today better men and women because he lived. He left a stainless record as a man and citizen, and an inspiring example to young men of the profession.